
APPENDIX 1-A: TABLES

TABLE 1 – Total Reef Area in the Galveston Bay System.

The total amount of reef and unconsolidated shelly sediments in the Galveston Bay system.

Galveston Bay System	Galveston Bay Excluding West Bay and Pelican Island Embayment
10794.544 hectares	5754.479 hectares
41.6 square miles	22.2 square miles
about 10.4% of bay area	53.3% of total reef

TABLE 2 – Total Reef Area By Location.

The total amount of reef and unconsolidated shelly sediments in the Galveston Bay system.

	Area (in hectares)	Area (in sq. miles)	Percent of Total Reef	Percent of Total Reef exclusive of West Bay
East Bay ³	1157.360	4.5	10.7%	20.1%
Trinity Bay ³	506.146	2.0	4.7%	8.8%
Redfish Bar ^{2, 4}	1336.049	5.2	12.4%	23.2%
North Redfish Bar ^{2, 4}	578.038	2.2	5.4%	10.1%
Red Bluff/ Morgans Pt. Embayment ^{2, 5}	123.347	0.5	1.1%	2.1%
Clear Lake Embayment ²	111.285	0.4	1.0%	1.9%
Dickinson Embayment ²	850.024	3.3	7.9%	14.8%
Pelican Island Embayment	835.697	3.2	7.7%	
West Bay	2995.224	11.6	27.7%	
West Bay Satellite Bays ⁶	1206.982	4.7	11.2%	
Houston Ship Channel ¹	1092.230*	4.2*	10.1%*	19.0%*

¹ Does not include extensive acreage adjacent to the channel forming part of South Redfish Reef.

² Exclusive of the reef associated with the Houston Ship Channel except for that associated with South Redfish Reef where a delineation between channel and non-channel reef could not be made.

³ Exact value depends upon the boundary defined between East Bay or Trinity Bay and Galveston Bay.

⁴ Exact value depends upon the boundary defined between Redfish Bar and the reef system north of Redfish Bar.

⁵ Includes the Cedar Bayou branch of Galveston Bay.

⁶ Includes Christmas Bay, Bastrop Bay, Oyster Lake, Chocolate Bay

TABLE 3 – Total Man-made Reef

Estimated fraction of the total reef and unconsolidated shelly sediment in the Galveston Bay system contributed by anthropogenic activities.

	Area (in hectares)	Area (in sq. miles)	Percent of Total Reef	Percent of Total Man-made Reef
Total Man-made	1961.657	7.3	18.2%	
Houston Ship Channel ¹	1092.230	4.2	10.1%	55.7%
Other Dredged Channels ⁴	382.110	1.5	3.5%	19.5%
Oil Fields and Pipe Lines ²	375.563	1.5	3.5%	19.1%
Artificial Reefs ³	175.553	0.7	1.6%	8.9%

¹ Does not include extensive acreage adjacent to the channel forming part of South Redfish Reef.

² Rough estimate only. Little information exists to differentiate natural reef from reef originating from oil field development in these areas.

³ Includes leases, reefs made for mitigation of shell dredging, reefs made to enhance the oyster fishery, etc. Rough estimate only; not all artificial reefs could be discretely identified, particularly in the Redfish Bar area, and little information exists to differentiate natural reef from man-made reef on leases.

⁴ Channel-associated reefs in Bastrop Bay not included

TABLE 4 – East Bay Comparison: 1970 and 1991

Comparison of the 1991 and circa-1970 survey of East Bay. Comparisons computed as 1991 area/circa-1970 area.

Reef	circa 1970 Area from Benefield and Hofstetter (1976)	1991 Area	Fractional Change
East Bay			
Bob's Knob	3.359	2.030	0.60
Bull Hill ²	76.568	114.052	
Buckshot Reefs ¹	4.614	8.852	1.92
Catfish Reef ¹	7.042	9.935	1.41
Cowshed Reef ¹	12.991	14.758	1.14
Drum Village Reef	47.916	37.508	
Frenchy's Reef ¹	83.246	74.879	0.90
Gale's Reef	63.901	95.578	
Hanna Reef ¹	526.103	475.067	
Lone Tree Reef ¹	7.446	8.288	1.11
Middle Reef	102.104	110.280	
Moody Reef ¹	13.760	15.900	1.16
North Bull Hill Reef ²	20.801	59.160	
Pepper Grove Reefs	49.777	70.355	1.41
Richard's Reef ¹	12.262	17.833	1.45
Stephenson Reef ¹	12.262	10.545	0.86
Terry's Ridge ¹	13.395	17.268	1.29
Whitehead Reef ¹	18.575	32.399	1.74

TABLE 4 – CONTINUED

Reef	circa 1970 Area from Benefield and Hofstetter (1976)	1991 Area	Fractional Change
Combined reefs ³			
Drum Village/Gale's/Middle Reef ¹	213.921	243.366	1.14
Bull Hill/Hanna Reef ^{1, 2}	623.472	648.279	1.04
Total ⁴	1076.122	1174.687	1.09

¹ Best comparison; other comparisons of limited usefulness because reef portions included in estimate might be different or because entire area included in 1991 estimate was not mapped by Benefield and Hofstetter (1976).

² Parts of Bull Hill and North Bull Hill Reef included here were not included in estimate for East Bay in Table 2.

³ Comparison of circa-1970 and 1991 boundaries uncertain for individual reef estimates. The combined estimate is more likely to be accurate.

⁴ Does not include reefs unsurveyed in circa-1970. See Table 2 for full area estimates.

TABLE 5 – Trinity Bay Comparison: 1970 and 1991

Comparison of the 1991 and circa-1970 survey of Trinity Bay. Comparisons computed as 1991 area/circa-1970 area.

Reef	circa 1970 Area from Benefield and Hofstetter (1976)	1991 Area	Fractional Change
Trinity Bay			
Big Beezley Reef ¹	30.109	30.927	1.03
Clamshell Reef ^{1, 2}	4.087	4.330	1.06
Dow Reef ¹	32.335	40.830	1.26
Dryhole Reef ^{1, 2}	6.313	5.746	0.91
Fisher Reef	69.122	123.757	1.79
Little Bird Reef ²	1.619	0.349	0.22
Lonesome Reef ^{1,2}	7.204	8.222	1.14
Lost Reef ¹	6.677	10.831	1.62
Middle Beezley Reef ¹	9.672	12.075	1.25
Old Yellow Reefs ²	2.590	19.976	7.71
Outer Beezley Reef ¹	9.308	20.674	2.22
Spoonbill Reef ²	1.214	6.958	5.73
Tern Reef ^{1, 2}	13.841	14.906	1.08
Tidewater Reef ¹	2.590	7.230	2.79
Trinity Reef ^{1,2}	7.446	6.072	0.82
Vingt-et-un Reef ¹	13.780	28.961	2.10
Total ³	217.907	341.844	1.57

¹ Best comparison; other comparisons of limited usefulness because reef portions included in estimate might be different or because entire area included in 1991 estimate was not mapped by Benefield and Hofstetter (1976).

² Partially or fully originating from man's activities.

³ Does not include reefs unsurveyed in circa-1970. See Table 2 for full area estimates.

TABLE 6 – Red Bluff/Morgans Point Comparison: 1970 and 1991

Comparison of the 1991 and circa-1970 survey of the Red Bluff/Morgans Point Embayment.
 Comparisons computed as 1991 area/circa-1970 area.

Reef	circa 1970 Area from Benefield and Hofstetter (1976)	1991 Area	Fractional Change
Red Bluff/Morgans Point Embayment			
Bayside Reef	0.405	0.000	0.0
Bent Pipe Reef	7.811	12.859	1.65
Crow's Nest Reef	0.809	1.840	2.27
Red Bluff Reef ¹	28.248	29.979	1.06
Tin Can Reefs	5.221	10.095	1.93
West Red Bluff Reef ¹	4.087	5.859	1.43
Yacht Club Reef ¹	13.395	19.057	1.42
Total ²	59.976	79.689	1.33

¹ Best comparison; other comparisons of limited usefulness because reef portions included in estimate might be different or because entire area included in 1991 estimate was not mapped by Benefield and Hofstetter (1976).

² Does not include reefs unsurveyed in circa-1970. See Table 2 for full area estimates.

TABLE 7 – Clear Lake Embayment Comparison: 1970 and 1991

Comparison of the 1991 and circa-1970 survey of the Clear Lake Embayment. Comparisons computed as 1991 area/circa-1970 area.

Reef	circa 1970 Area from Benefield and Hofstetter (1976)	1991 Area	Fractional Change
Clear Lake Embayment			
Bayview Reef ^{1, 2}	12.626	6.302	0.50
Clear Lake Channel Reefs ²	4.209	8.237	1.96
Courthouse Reef ²	3.359	1.953	0.58
Eagle Point Reef ^{1, 2}	17.078	14.725	0.86
Halfway Reef ²	2.954	10.778	3.65
Humble Reef ¹	2.590	0.606	0.23
Little Scott Reef ¹	2.954	3.130	1.06
Pine Gully Reef	1.497	0.000	0.00
San Leon Reef ¹	24.889	34.385	1.38
Scott Reef ¹	14.488	13.478	0.93
Smith Reef ¹	3.723	9.732	2.61
Total ³	90.367	103.326	1.14

¹ Best comparison; other comparisons of limited usefulness because reef portions included in estimate might be different or because entire area included in 1991 estimate was not mapped by Benefield and Hofstetter (1976).

² Partially or fully originating from man's activities.

³ Does not include reefs unsurveyed in circa-1970. See Table 2 for full area estimates.

TABLE 8 – Dickinson Embayment Comparison: 1970 and 1991

Comparison of the 1991 and circa-1970 survey of the Dickinson Embayment. Comparisons computed as 1991 area/circa-1970 area.

Reef	circa 1970 Area from Benefield and Hofstetter (1976)	1991 Area	Fractional Change
Dickinson Embayment			
April Fools Reef	26.750	43.214	1.62
Crescent Reef ²	8.175	3.621	0.44
Dickinson Channel Reefs ²	2.550	40.330	15.82
Dickinson Reef ¹	78.026	64.028	0.82
Dollar Reef ¹	107.285	215.848	2.01
Experimental Reef ²	2.954	2.344	0.79
Half Moon Reef ¹	14.852	16.717	1.13
Island Reef ²	7.042	3.689	0.52
Levee Reef ¹	80.534	81.109	1.01
Little Half Moon Reef ¹	0.486	1.348	2.77
Marsh Reef	4.452	10.158	2.28
Moses Gate Reef ²	1.052	6.262	5.95
Shoal Reef ²	1.133	1.974	1.74
Todds Dump and Redfish Island ^{1, 4}	218.130	283.722	1.30
Total ³	553.421	774.364	1.40

¹ Best comparison; other comparisons of limited usefulness because reef portions included in estimate might be different or because entire area included in 1991 estimate was not mapped by Benefield and Hofstetter (1976).

² Partially or fully originating from man's activities.

³ Does not include reefs unsurveyed in circa-1970. See Table 2 for full area estimates.

⁴ Redfish Island included in the estimate of reef along the Houston Ship Channel in Table 2 rather than in the Dickinson Embayment. Redfish Island included here for comparison to estimates of Benefield and Hofstetter (1976).

TABLE 9 – North Redfish Bar Comparison: 1970 and 1991

Comparison of the 1991 and circa-1970 survey of the North Redfish Bar sector. Comparisons computed as 1991 area/circa-1970 area.

Reef	circa 1970 Area from Benefield and Hofstetter (1976)	1991 Area	Fractional Change
North Redfish Bar			
Bar 24 Reefs	1.902	2.226	1.17
Bart's Pass ¹	95.508	68.956	
Bart's Pass West ²	7.811	81.325	
Possum Pass ¹	33.428	72.181	2.13
Roberts Reef	3.318	10.884	3.28
Sheldon Reef ¹	20.801	46.164	2.22
Combined reefs ⁴			
Bart's Pass/Bart's Pass West ¹	103.319	150.281	1.45
Total ³	162.768	281.736	1.73

¹ Best comparison; other comparisons of limited usefulness because reef portions included in estimate might be different or because entire area included in 1991 estimate was not mapped by Benefield and Hofstetter (1976).

² Partially or fully originating from man's activities.

³ Does not include reefs unsurveyed in circa-1970. See Table 2 for full area estimates.

⁴ Comparison of circa-1970 and 1991 boundaries uncertain for individual reef estimates. The combined estimate is more likely to be accurate.

TABLE 10 – Redfish Bar Comparison: 1970 and 1991

Comparison of the 1991 and circa-1970 survey of Redfish Bar. Comparisons computed as 1991 area/circa-1970 area.

Reef	circa 1970 Area from Benefield and Hofstetter (1976)	1991 Area	Fractional Change
Redfish Bar			
Archie's Reef	3.723	3.426	0.92
Bull Shoals ¹	34.925	40.264	1.15
"C" Reef	3.723	5.432	1.46
Dee's Reef	2.954	8.174	2.77
East Redfish Reef ¹	31.607	82.014	2.59
Four Bit Reef ^{1, 2}	9.672	9.206	0.95
Gaspip Reef ^{1, 2}	14.124	20.687	1.46
Mary's Reef	8.174	18.414	2.25
Mattie B. Reef ¹	20.801	14.938	0.72
Missing Reef ²	9.308	9.175	0.99
North Redfish Reef ¹	202.914	237.984	1.17
Pasadena Reef ¹	12.950	49.853	3.85
Santa Reefs	3.359	7.112	2.12
Slim Jim Reef ¹	8.903	31.236	3.51
South Redfish Reef ^{1, 4}	371.874	702.109	1.89
Tom Tom Reef ¹	5.585	3.573	0.64
Triangle Reef ²	3.723	7.796	2.09
Total ³	748.319	1251.393	1.67

¹ Best comparison; other comparisons of limited usefulness because reef portions included in estimate might be different or because entire area included in 1991 estimate was not mapped by Benefield and Hofstetter (1976).

² Partially or fully originating from man's activities.

³ Does not include reefs unsurveyed in circa-1970. See Table 2 for full area estimates.

⁴ Portion of South Redfish Reef located on the Houston Ship Channel spoil banks included in this estimate, rather than in Table 11.

TABLE 11 – Houston Ship Channel Sector Comparison: 1970 and 1991

Comparison of the 1991 and circa-1970 survey of the Houston Ship Channel sector. Comparisons computed as 1991 area/circa-1970 area.

Reef	circa 1970 Area from Benefield and Hofstetter (1976)	1991 Area	Fractional Change
Houston Ship Channel ³			
Morgans Point Reefs ²	0.405	14.122	34.869
"53" Reefs ²	15.945	177.977	11.16
"59" Reefs ²	56.495	192.746	3.41
"63" Reefs ²	26.022	146.898	5.65
Total ¹	98.867	531.743	5.38

¹ Does not include reefs unsurveyed in circa-1970. See Table 2 for full area estimates.

² Partially or fully originating from man's activities.

³ Reef adjacent to Redfish Island and that portion of South Redfish reef on the spoil bank not included in these estimates. See Table 2 for full area estimates.